

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
26 May 2005 (26.05.2005)

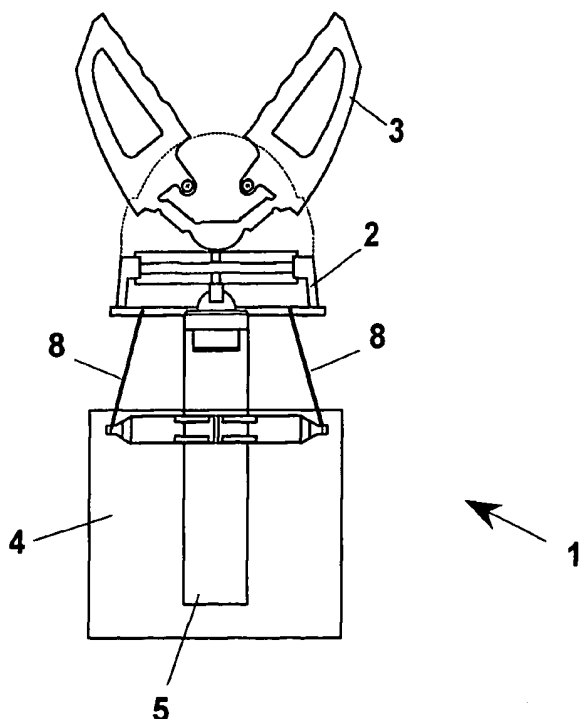
PCT

(10) International Publication Number  
**WO 2005/046500 A1**

- (51) International Patent Classification<sup>7</sup>: **A61B 19/00** (74) Agent: CELESTINO, Marco; ABM Agenzia Brevetti & Marchi, Viale Giovanni Pisano, 31, I-56123 Pisa (IT).
- (21) International Application Number: PCT/IB2004/003731
- (22) International Filing Date: 15 November 2004 (15.11.2004)
- (25) Filing Language: Italian
- (26) Publication Language: English
- (30) Priority Data: PI2003A000107 14 November 2003 (14.11.2003) IT
- (71) Applicants and
- (72) Inventors: BERGAMASCO, Massimo [IT/IT]; Via Don Minzoni, 144, I-56011 Castelmaggiore - Calci PI (IT). SALSEDO, Fabio [IT/IT]; Viale Umberto Primo, 100, I-04100 Latina LT (IT). SPINELLI, Stefano [IT/IT]; Via Maolina Traversa 3<sup>a</sup>, n. 406, I-55100 Lucca LU (IT). FONTANA, Marco [IT/IT]; Via Ridolfi 6, I-56124 Pisa (IT).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE,

[Continued on next page]

(54) Title: REMOTELY ACTUATED ROBOTIC WRIST



(57) Abstract: Remotely actuated robotic wrist for applications in the field of teleoperation, for example for miniminvasive surgical operations, comprising a distal element (3) mounted on a support (2) capable instantaneously to rotate with respect to a fixed member (5), for example by a ball joint (10) that allows three rotational degrees of freedom. In particular, the support (2) can be oriented with respect to the fixed member (5) with a redundant actuating system by arranging four forces in eccentric points, for example by means of tendons (8), and causing the rotation of the support (2) about the central post (5) by the ball joint (10). Alternatively, the support (2) can be oriented with respect to the fixed member (5) by a mechanism that reproduces the rolling of a mobile sphere, which belongs to the support, on a fixed sphere, integral to the fixed member.

WO 2005/046500 A1



SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments